

**HOME**

AN ADDED SPECIALIST PUBLICATION  
No. 94 Jan 9-16,  
1985

35c

# Computing

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twisters for  
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4-D  
arrays—can  
you cope?



# COMMODORE C16 AND PLUS 4

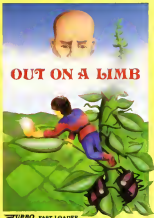
LAS VEGAS



MOON KIDDOY



FLIGHTPATH



**TURBO FAST LOADER**

**LAS VEGAS** Las Vegas brings all the challenges of a deluxe arcade fruit machine direct to your fingertips. Many exciting features include gamble mode, collect medals and number options, with a three row display and maximum payout of 500.  
R.P. Only C.16 or M.

**MOON KIDDOY** This is an exhilarating arcade adventure in which the evil powers of hell have captured the signs of the Zodiac in the four haunted chambers of the Abyss. Struggle to defeat these signs and at the same time try to outwit everything in your way. How long can you stay alive?  
J.S. or R.P. C.16 or M.

**FLIGHTPATH** Race Peltz around the screen, moving far faster to alter the mass homeward bound of the many monsters who are constantly attacking Peltz as you attempt to collect the bonus treasure. Also if you can touch the edge of the mass the monsters will suddenly burst into flames but look out they'll soon be back!  
J.S. or R.P. C.16 or M.

**OUT ON A LIMB** You must skillfully manoeuvre your jumping pated wabbit over the ground, over water as well as large boulders and carefully placed mines. Not only this but avoid the hovering alien spaceship as it hounds you from above.  
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**SO TIME BURN** An adrenaline of the planet Corillian, your quest is one of anger and revenge. The alien empire are tyrants full of the latest hi-tech computers and more powerful weapons. Also included are full 3D graphics to add unbelievable realism to this fantastic journey through time itself, and beyond.  
J.S. or R.P. C.16 or M.

**SCRAMBLE** Earth has been overrun by the Gubruks and its up to you to battle through the air frenetic and testing action. Adventure includes meteors, UFO's and deadly fireballs. Fly through an armoured city then an alien base and finally the command base itself.  
J.S. or R.P. C.16 or M.

**FLIGHTPATH** Flightpath is without doubt the best flight simulator on the C16 and Plus 4. There are elaborate features to include: Altimeter, Speed, directional headings, crosswinds, three ground warning lights and reverse thrust to name but a few. Also included are smooth graphics as you take off, cruise over mountains and land once again.  
J.S. or R.P. C.16 or M.

**OUT ON A LIMB** This is a fantastic wabbit, parts outrageously funny game. Based on the fairy tale of Jack and the Beanstalk, Out On A Limb is full of the most strange and powerful characters you are ever likely to meet. Firstly climb the stalk and jump onto the stalks, then enter the giant's castle searching for treasure. However watch out for various dangers: musical notes, skeletons and giant plants, all of which cause you to lose the many and valuable items of the castle. Once the treasure is collected the single wabbit will be spread, and then.....?  
J.S. or R.P. C.16 or M.

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```

10 REM Disassembler
20 REM By Shingo Sugura
30 REM July 1984
40
50 ON ERROR VDU15,10,13:END
60 MODE7:VDU23;8202;0;0;0;
70 PROCassemble
80 INPUT"Start address">code$
90 addressX=EVAL("%s">code$)
100 INPUT"End address ">code$
110 endX=EVAL("%s">code$)
120 PROCset_up
130 REPEAT
140   PROChex (addressX)
150   opcode$="addressX:typeX=code$opcodeX
160   PROCdecode (opcodeX,typeX)
170   addressX=addressX+byteX
180   UNTIL addressX=endX
190 VDU15
200 END
210 DEFPROCdecode (codeX,typeX)
220 PRINTTAB(16,UPPER)aseason.c$ (codeX) " "code$ (typeX);
230 PROCcode (typeX)
240 PRINT
250 ENDPROC
260 DEFPROCcode (typeX)
270 IF typeX=0 byteX=1 ELSE IF typeX=1 PROCimmediate
280 IF typeX=2 OR typeX=3 OR typeX=4 PROCabs ELSE IF typeX=5 PROCrelat
ive
290 IF typeX=6 OR typeX=7 OR typeX=8 PROCzero ELSE IF typeX=9 byteX=2
300 IF typeX=10 PROCind ELSE IF typeX=11 OR typeX=12 PROCindX
310 PROCmemory (byteX)
320 ENDPROC
330 DEFPROCimmediate
340 byteX=2
350 AX=addressX+1:CALLcode
360 ENDPROC
370 DEFPROCabs
380 byteX=3
390 PROChex (addressX+1 AND &FFFF)
400 IF typeX=3 PRINT",X"; ELSE IF typeX=4 PRINT",Y";
410 ENDPROC
420 DEFPROCrelative
430 byteX=2
440 offsetX=addressX+1
450 IF offsetX>127 offsetX=offsetX-256
460 branchX=addressX+offsetX+1
470 PROChex (branchX)
480 ENDPROC
490 DEFPROCzero
500 byteX=2
510 AX=addressX+1:CALLcode
520 IF typeX=7 PRINT",X"; ELSE IF typeX=8 PRINT",Y";
530 ENDPROC
540 DEFPROCind
550 byteX=3
560 PROChex (addressX+1 AND &FFFF)

```

```

570 PRINT":)"
580 ENDFPROC
590 DEFPROCIndX
600 ByteX=2
610 A2=addressX*1:CALLcode
620 IF typeX=11 PRINT",X)"; ELSE PRINT",Y)";
630 ENDFPROC
640 DEFPROCmemory(countX)
650 FOR loopX=0 TO countX-1
660 PRINTTAB(6+loopX+3,VPOS);
670 peekX=addressX*1loopX
680 A3=peekX:CALLcode
690 PRINTTAB(29+loopX,VPOS);
700 IF peekX<31 AND peekX<127 PRINT"<R(peekX)"; ELSE PRINT". ";
710 NEXT
720 ENDFPROC
730 DEFPROChex(numberX)
740 A3=numberX DIV 256:CALLcode
750 A3=numberX MOD 256:CALLcode
760 ENDFPROC
770 DEFPROCset_up
780 CLR
790 PROChex(addressX)
800 PRINT">";
810 PROChex(IndX)
820 VPOS=0,24,39,1,30,14
830 ENDFPROC
840 DEFPROCassemble
850 DIM code 100,code 256,code$(13),anonon:c4(256)
860 search=8FFFF
870 FOR pass=0 TO 2 STEP 0.5FX=code
880 LEFT pass
890 .phen
900 PHA:AND#1FO
910 ROR A,ROR A,ROR A,ROR A
920 JBR hex
930 PLA:AND#0F:JMP hex
940 .hex
950 ORA#C0:ORF#3A:ANI out
960 ACCH
970 .out JMP search
980 JNEXT
990 FOR loopX=0 TO 255
1000 READ data#
1010 anonon:c4(loopX)=RIGHT$(data#,3)
1020 code~loopX=ASC(LEFT$(data#,1))-ASC"a"
1030 NEXT
1040 FOR loopX=0 TO 12
1050 READ code$(loopX)
1060 NEXT
1070 ENDFPROC
1080 DATA aBRK,gORA,a??? ,a??? ,a??? ,gORA,gASL,a???
1090 DATA aPLP,bORA,iASL,a??? ,a??? ,cORA,cASL,a???
1100 DATA aBPL,eORA,a??? ,a??? ,a??? ,dORA,hASL,a???
1110 DATA aDLC,eORA,a??? ,a??? ,a??? ,dORA,dASL,a???
1120 DATA cJBR,lAND,a??? ,a??? ,gBIT,gAND,gROL,a???
1130 DATA aPLP,bAND,jROL,a??? ,cBIT,cAND,cROL,a???
1140 DATA aBRI,mAND,a??? ,a??? ,a??? ,hAND,hROL,a???

```

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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## The Music System BBC B £24.95

Island Logic, 23 St Peter's Sq, London W6 8BE

A well packaged comprehensive system is offered contained in a video style vinyl box. There are two disks, one containing the system operators and the other a "song and sound library". You also get a manual which, over 70 pages, explains in considerable detail the operation of the system and finally goes on to give steps to help with the keyboard commands.

The quality of the product is evident throughout. I found that everything worked as it should, smoothly and with a minimum of fuss after a short period of familiarisation. Full marks for user friendliness. This was also largely due to the use of icons and other appropriately placed graphics.

The "Quick Guide To The Music System" was short and sweet. It should indeed not allowed you to scratch all the main elements very rapidly. The writer adopts a light-hearted approach, with occasional flashes of wit like the explanation of icons — "we don't mean Russian telephone symbols, but may-to-remember symbols".

On opening up you enter the Control Screen which gives you access to all the facilities. There are five main areas (each with their own icons) and jobs.

The first of these is the Editor. This, if you are composing a new equivalent of an arrangement. The range is impressive allowing 160 notes on the main screen and placed at any key with the function to transpose into any other key. You input can be added and displayed in classic notation. Tempo range from 30 to 200 measures beats per minute. All users are retained despite the use of icons with one exception.

The System also allows fifteen sound shapes to be named as "sound developers". The sound is made up by different 16 parameters and the sound can be heard immediately. A frequency and amplitude graph

is an additional feature which can also be used to update the envelope parameters. Envelope use of icons make the action easier than it seems.

The Keyboard gives you an alternative method of composition. With printed displays you can try and a tune with the search range by the Synthesiser Menu appear on screen as you depress a key or position on the screen keyboard. This was a very welcome opportunity to test all sorts of sound with the ability to store them on a music bank on screen memory.

The Editor is, in the more suggests a certain learning up as the file is to be saved and played back at one place. Other features make this a versatile option.

The final feature is the Printer which is more a title to try out. The manual says it's compatible with Epson 85, 15, and four Delta series dot matrix printers.

There are many additional facilities which allow a great flexibility in composing and playing with sounds. The editor allows save storage and transfer from one screen to another. There further programs allow you to copy the Song and Sound Library from disk to disk to disk. You can copy music files from disk to cassette and vice versa and the system develops files from music files.

There is all this plus the ability to learn to read your recorded material to adjust too to greater things. It was an easy program to use, versatile in its application allowing a child to experiment with a computer to give it a more useful application. At this price it is highly

# In-depth analysis

This week we bring you the first of many in-depth reviews on the more expensive utilities available for all types of computer. Read an expert opinion before you buy

commanded	M.P
arrangement	100%
storage	100%
size of use	100%
value for money	100%



## Breden's BASIC CUM-64 £59.95

Yorpes, 1 Felony Mews, London E1 6NF

Yorpes have come up with yet another "improved" BASIC package for the CUM-64. For your money you receive a 160 page manual and the extended BASIC on both tape and disk. The idea of supplying both cassette and disk is a good way of catering for all types of system and expansion.

The language covers almost all areas and is pretty extensive. Unfortunately there are not many hints and tips to machine code programmers. This may not be so important as an expert but for a beginner in this field it would be most helpful.

The spent graphics commands are very good. You only need to supply the computer with your shapes — all the FORKs and using up of memory areas is done for you. The limitation is that you may only have 16 colors definitions to select right now, although you may change this to any color. A user may be able to draw one point to another on the screen by specifying an extension. The computer will then work a smoothly between the points. (Distance direction is also handled very well.)

The graphics commands go as far as their own drawing lines and boxes. The images such as circles, arcs, polygons and drawings are defined shapes listed in Breden's BASIC are not present in Breden's BASIC.

Full control over sound is given, it is even possible to play chords, quite many. The only thing about the sound commands is that they take away all of the

convenience FORKs that are currently required and to make things more simple.

The basic 160 commands for loading the keyboard, pointers and pointers seem to be quite a lot of work. They all have well known single FILE/FORK operations. Using the Breden's BASIC commands have only about 1000 (your program) compared with a standard 40.

Programs are easily fixed, done, memory load it once, old and standard key commands along with some other which are not used.

The advanced programming features are provided. 2500 commands which make your programming more and more advanced.

In conclusion I will say that Breden's BASIC has some good features but there are a couple of things to be aware of. The commands being unnecessary and using up real program. Surely an extended BASIC should allow the programmer to do more things, not already having more in a different way.

arrangement	100%
size of use	100%
value for money	100%



Island Logic



Breden's BASIC

**Find where you buried the bone — watching out for marauding birds — and stack them in your dog bowl. A true family game from R N Butcher**

This arcade-type game is suitable for a younger child, but the graphics should be good enough for use in a family group.

The idea is to throw three bones into the dog bowl, firstly finding where they are buried, and then hoping a bird doesn't fly down and intercept them.

Three time limits are added to your time for taking to get three bones, and every time you dig and fail to find a bone.

Whether a bone is found in a particular position or not is determined before the start of each game and not immediately after each key press.

Instructions are included in the program.

# Give a dog a bone

**Variables**  
 01,04,05,08 dog graphics  
 01,05,08 track graphics  
 01 instructions  
 01 time left  
 game of game = 1 then last time

**Constants**  
 1 vertical position of dog  
 2 horizontal position of dog  
 3 horizontal position of bone  
 4 vertical position of bone  
 5 vertical position of bone  
 6 bone number of bones to find  
 7 time to 10 seconds and on  
 8 10 added to 10 for no time  
 9 0 BIRD colour for BIRD  
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## Screen dump



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**Where it works**  
 1-100 moves bone and bird  
 11 checks if collision  
 12-14 moves bone (horizontal)  
 15-17 moves bone (vertical)  
 18-20 moves bone  
 21 checks for end of game  
 22-24 before game given each  
 25 horizontal position a value  
 26-28 sets variables  
 29-31 checks for legs gone  
 32 determines what bone  
 33 found or not  
 34-36 moves dog, check for  
 37 end game  
 38 checks for key = 0  
 39-41 checks for last time  
 42-44 sets time (total and  
 45 sound effects)  
 46-48 sets and prepares screen  
 49 sets game  
 50-52 sets music  
 53-55 "variable" speech  
 56-58 sets bone  
 59-61 PULSES sound and plays  
 62 bone  
 63-65 sets and plays music  
 66 time  
 67-69 before time  
 70-72 sets music  
 73-75 instructions/game  
 76-78  
 79-81 instructions  
 82-84 sets music  
 85-87 sets music  
 88-90 sets music  
 91-93 sets music  
 94-96 sets music  
 97-99 sets music  
 100 sets music













# Blackjack

Show a flourish for cards with this game by Jonathan Fancey.  
Beat the computer — or lose your money

All the rules of position apply when the object of the game is to get as close to 21 without going over. The player (you) always goes first, the dealer being the VIC-20.

You are dealt with two cards as the start and can choose to take another by 'raising'. Your card face value of the cards is shown above them and flashes during your go. If you get a five card trick (five cards which

40000-40000 load graphics and machine code  
41000-41000 clear variables for new game  
430000 run out of money routine

equal 21 or less) you win instantly as you do if you get 21 or less than the VIC's total at the end of the hand. But the VIC always wins on the draw.

If you choose to 'buck' the VIC will have to go trying to accumulate as high a score as it dares. If you do win the hand you are given the option to gamble your original bet four times as much as the original stake. But if you choose to collect you only get twice your stake added on to your total.

When you gamble you have to choose three cards of the five displayed. They are made more difficult by the fact that the cards are shown face down and only turn over when you choose them in whichever possible to get 21. But if you fail to get 21 with the three dealt you win nothing and the original stake is lost to the VIC.

You start off with £100 and

## POKE code

34777 screen and border colours  
34778 colours for boards  
34779 wheel motor  
34780 wheel 1  
34781 wheel 2  
34782 wheel 3  
34783 high resolution power to station  
4000-4000 screen memory  
71000-71000 colour memory

you start your bet by entering a number of pounds between 01 and £50. If you do not have the amount of money entered the message 'A01010' will appear and the bet must be entered again.

The game continues until you do not want another go or you run out of money.

## Variables

1000 string of screen positioning for cards  
101 colour cards  
4000 main pack of cards  
4000 amount of money to be won  
4010 number of cards  
4110 player's total of cards  
A card chosen  
A200 top of card (PLACE card)

## ATS card's set

CT computer's total  
TC amount of player's cash  
P number of cards in pack  
CF amount of money won  
TU player's money

## Make an extension

This program was kept free POKE codes and is programmed mainly in ordinary Commodore BASIC. Therefore there are no number machine should people find problems in the machine code routine would need this extension.

## Control

G gamble  
C collect  
T turn  
A stick  
H not a high topack 10  
L not a low topack 11  
Type in bet with number keys and hit return afterwards

Note: Part 1 of the program changed the start of BASIC on screen defined characters in the main program, and therefore must always be loaded first, before the main program.

## Loading 1

```

1 GOTO 40000
2 IF P<0 THEN GOTO 40000
3 IF P<0 THEN GOTO 40000
4 IF P<0 THEN GOTO 40000
5 IF P<0 THEN GOTO 40000
6 IF P<0 THEN GOTO 40000
7 IF P<0 THEN GOTO 40000
8 IF P<0 THEN GOTO 40000
9 IF P<0 THEN GOTO 40000
10 IF P<0 THEN GOTO 40000
11 IF P<0 THEN GOTO 40000
12 IF P<0 THEN GOTO 40000
13 IF P<0 THEN GOTO 40000
14 IF P<0 THEN GOTO 40000
15 IF P<0 THEN GOTO 40000
16 IF P<0 THEN GOTO 40000
17 IF P<0 THEN GOTO 40000
18 IF P<0 THEN GOTO 40000
19 IF P<0 THEN GOTO 40000
20 IF P<0 THEN GOTO 40000
21 IF P<0 THEN GOTO 40000
22 IF P<0 THEN GOTO 40000
23 IF P<0 THEN GOTO 40000
24 IF P<0 THEN GOTO 40000
25 IF P<0 THEN GOTO 40000
26 IF P<0 THEN GOTO 40000
27 IF P<0 THEN GOTO 40000
28 IF P<0 THEN GOTO 40000
29 IF P<0 THEN GOTO 40000
30 IF P<0 THEN GOTO 40000
31 IF P<0 THEN GOTO 40000
32 IF P<0 THEN GOTO 40000
33 IF P<0 THEN GOTO 40000
34 IF P<0 THEN GOTO 40000
35 IF P<0 THEN GOTO 40000
36 IF P<0 THEN GOTO 40000
37 IF P<0 THEN GOTO 40000
38 IF P<0 THEN GOTO 40000
39 IF P<0 THEN GOTO 40000
40 IF P<0 THEN GOTO 40000
41 IF P<0 THEN GOTO 40000
42 IF P<0 THEN GOTO 40000
43 IF P<0 THEN GOTO 40000
44 IF P<0 THEN GOTO 40000
45 IF P<0 THEN GOTO 40000
46 IF P<0 THEN GOTO 40000
47 IF P<0 THEN GOTO 40000
48 IF P<0 THEN GOTO 40000
49 IF P<0 THEN GOTO 40000
50 IF P<0 THEN GOTO 40000
51 IF P<0 THEN GOTO 40000
52 IF P<0 THEN GOTO 40000
53 IF P<0 THEN GOTO 40000
54 IF P<0 THEN GOTO 40000
55 IF P<0 THEN GOTO 40000
56 IF P<0 THEN GOTO 40000
57 IF P<0 THEN GOTO 40000
58 IF P<0 THEN GOTO 40000
59 IF P<0 THEN GOTO 40000
60 IF P<0 THEN GOTO 40000
61 IF P<0 THEN GOTO 40000
62 IF P<0 THEN GOTO 40000
63 IF P<0 THEN GOTO 40000
64 IF P<0 THEN GOTO 40000
65 IF P<0 THEN GOTO 40000
66 IF P<0 THEN GOTO 40000
67 IF P<0 THEN GOTO 40000
68 IF P<0 THEN GOTO 40000
69 IF P<0 THEN GOTO 40000
70 IF P<0 THEN GOTO 40000
71 IF P<0 THEN GOTO 40000
72 IF P<0 THEN GOTO 40000
73 IF P<0 THEN GOTO 40000
74 IF P<0 THEN GOTO 40000
75 IF P<0 THEN GOTO 40000
76 IF P<0 THEN GOTO 40000
77 IF P<0 THEN GOTO 40000
78 IF P<0 THEN GOTO 40000
79 IF P<0 THEN GOTO 40000
80 IF P<0 THEN GOTO 40000
81 IF P<0 THEN GOTO 40000
82 IF P<0 THEN GOTO 40000
83 IF P<0 THEN GOTO 40000
84 IF P<0 THEN GOTO 40000
85 IF P<0 THEN GOTO 40000
86 IF P<0 THEN GOTO 40000
87 IF P<0 THEN GOTO 40000
88 IF P<0 THEN GOTO 40000
89 IF P<0 THEN GOTO 40000
90 IF P<0 THEN GOTO 40000
91 IF P<0 THEN GOTO 40000
92 IF P<0 THEN GOTO 40000
93 IF P<0 THEN GOTO 40000
94 IF P<0 THEN GOTO 40000
95 IF P<0 THEN GOTO 40000
96 IF P<0 THEN GOTO 40000
97 IF P<0 THEN GOTO 40000
98 IF P<0 THEN GOTO 40000
99 IF P<0 THEN GOTO 40000
100 IF P<0 THEN GOTO 40000

```

## Loading 2

```

1 GOTO 40000
2 IF P<0 THEN GOTO 40000
3 IF P<0 THEN GOTO 40000
4 IF P<0 THEN GOTO 40000
5 IF P<0 THEN GOTO 40000
6 IF P<0 THEN GOTO 40000
7 IF P<0 THEN GOTO 40000
8 IF P<0 THEN GOTO 40000
9 IF P<0 THEN GOTO 40000
10 IF P<0 THEN GOTO 40000
11 IF P<0 THEN GOTO 40000
12 IF P<0 THEN GOTO 40000
13 IF P<0 THEN GOTO 40000
14 IF P<0 THEN GOTO 40000
15 IF P<0 THEN GOTO 40000
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17 IF P<0 THEN GOTO 40000
18 IF P<0 THEN GOTO 40000
19 IF P<0 THEN GOTO 40000
20 IF P<0 THEN GOTO 40000
21 IF P<0 THEN GOTO 40000
22 IF P<0 THEN GOTO 40000
23 IF P<0 THEN GOTO 40000
24 IF P<0 THEN GOTO 40000
25 IF P<0 THEN GOTO 40000
26 IF P<0 THEN GOTO 40000
27 IF P<0 THEN GOTO 40000
28 IF P<0 THEN GOTO 40000
29 IF P<0 THEN GOTO 40000
30 IF P<0 THEN GOTO 40000
31 IF P<0 THEN GOTO 40000
32 IF P<0 THEN GOTO 40000
33 IF P<0 THEN GOTO 40000
34 IF P<0 THEN GOTO 40000
35 IF P<0 THEN GOTO 40000
36 IF P<0 THEN GOTO 40000
37 IF P<0 THEN GOTO 40000
38 IF P<0 THEN GOTO 40000
39 IF P<0 THEN GOTO 40000
40 IF P<0 THEN GOTO 40000
41 IF P<0 THEN GOTO 40000
42 IF P<0 THEN GOTO 40000
43 IF P<0 THEN GOTO 40000
44 IF P<0 THEN GOTO 40000
45 IF P<0 THEN GOTO 40000
46 IF P<0 THEN GOTO 40000
47 IF P<0 THEN GOTO 40000
48 IF P<0 THEN GOTO 40000
49 IF P<0 THEN GOTO 40000
50 IF P<0 THEN GOTO 40000
51 IF P<0 THEN GOTO 40000
52 IF P<0 THEN GOTO 40000
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58 IF P<0 THEN GOTO 40000
59 IF P<0 THEN GOTO 40000
60 IF P<0 THEN GOTO 40000
61 IF P<0 THEN GOTO 40000
62 IF P<0 THEN GOTO 40000
63 IF P<0 THEN GOTO 40000
64 IF P<0 THEN GOTO 40000
65 IF P<0 THEN GOTO 40000
66 IF P<0 THEN GOTO 40000
67 IF P<0 THEN GOTO 40000
68 IF P<0 THEN GOTO 40000
69 IF P<0 THEN GOTO 40000
70 IF P<0 THEN GOTO 40000
71 IF P<0 THEN GOTO 40000
72 IF P<0 THEN GOTO 40000
73 IF P<0 THEN GOTO 40000
74 IF P<0 THEN GOTO 40000
75 IF P<0 THEN GOTO 40000
76 IF P<0 THEN GOTO 40000
77 IF P<0 THEN GOTO 40000
78 IF P<0 THEN GOTO 40000
79 IF P<0 THEN GOTO 40000
80 IF P<0 THEN GOTO 40000
81 IF P<0 THEN GOTO 40000
82 IF P<0 THEN GOTO 40000
83 IF P<0 THEN GOTO 40000
84 IF P<0 THEN GOTO 40000
85 IF P<0 THEN GOTO 40000
86 IF P<0 THEN GOTO 40000
87 IF P<0 THEN GOTO 40000
88 IF P<0 THEN GOTO 40000
89 IF P<0 THEN GOTO 40000
90 IF P<0 THEN GOTO 40000
91 IF P<0 THEN GOTO 40000
92 IF P<0 THEN GOTO 40000
93 IF P<0 THEN GOTO 40000
94 IF P<0 THEN GOTO 40000
95 IF P<0 THEN GOTO 40000
96 IF P<0 THEN GOTO 40000
97 IF P<0 THEN GOTO 40000
98 IF P<0 THEN GOTO 40000
99 IF P<0 THEN GOTO 40000
100 IF P<0 THEN GOTO 40000

```

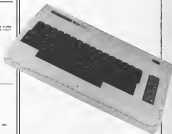




```

1000  PRINT "*****"
1010  PRINT "*****"
1020  PRINT "*****"
1030  PRINT "*****"
1040  PRINT "*****"
1050  PRINT "*****"
1060  PRINT "*****"
1070  PRINT "*****"
1080  PRINT "*****"
1090  PRINT "*****"
1100  PRINT "*****"
1110  PRINT "*****"
1120  PRINT "*****"
1130  PRINT "*****"
1140  PRINT "*****"
1150  PRINT "*****"
1160  PRINT "*****"
1170  PRINT "*****"
1180  PRINT "*****"
1190  PRINT "*****"
1200  PRINT "*****"
1210  PRINT "*****"
1220  PRINT "*****"
1230  PRINT "*****"
1240  PRINT "*****"
1250  PRINT "*****"
1260  PRINT "*****"
1270  PRINT "*****"
1280  PRINT "*****"
1290  PRINT "*****"
1300  PRINT "*****"
1310  PRINT "*****"
1320  PRINT "*****"
1330  PRINT "*****"
1340  PRINT "*****"
1350  PRINT "*****"
1360  PRINT "*****"
1370  PRINT "*****"
1380  PRINT "*****"
1390  PRINT "*****"
1400  PRINT "*****"
1410  PRINT "*****"
1420  PRINT "*****"
1430  PRINT "*****"
1440  PRINT "*****"
1450  PRINT "*****"
1460  PRINT "*****"
1470  PRINT "*****"
1480  PRINT "*****"
1490  PRINT "*****"
1500  PRINT "*****"
1510  PRINT "*****"
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1570  PRINT "*****"
1580  PRINT "*****"
1590  PRINT "*****"
1600  PRINT "*****"
1610  PRINT "*****"
1620  PRINT "*****"
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1770  PRINT "*****"
1780  PRINT "*****"
1790  PRINT "*****"
1800  PRINT "*****"
1810  PRINT "*****"
1820  PRINT "*****"
1830  PRINT "*****"
1840  PRINT "*****"
1850  PRINT "*****"
1860  PRINT "*****"
1870  PRINT "*****"
1880  PRINT "*****"
1890  PRINT "*****"
1900  PRINT "*****"
1910  PRINT "*****"
1920  PRINT "*****"
1930  PRINT "*****"
1940  PRINT "*****"
1950  PRINT "*****"
1960  PRINT "*****"
1970  PRINT "*****"
1980  PRINT "*****"
1990  PRINT "*****"
2000  PRINT "*****"

```



## Star Warp £2K BBC £7.95

Superior, Rapsia Hm, Skanor  
Lane, Leeds 7

This game is rather old but and I am surprised that Superior were prepared to put their name to it. It is a 3D space game in which you have a ship and there are huge numbers of fast moving space ships to shoot.

They appear as if large numbers and deliver a number of laser blasts to your ship before disappearing again. The target is the removal of photons from the blast that your ship emits after each one taking up fuel. Another limiting factor is the concentration of your weapons. If this double 3D high gun are left unattended without any defence and they are in space. Just there is a great deal of action and huge graphics.

It would have been impressive if you had been plotting the ship instead of just aiming the sight. The graphics are good, steady and quite interesting but even this computer game for game above the mediocre. If it could be more challenging it would be a lot more fun to make any impact at all.

entertainment 10%  
playability 40%  
graphics 15%  
value for money 10%



## Jack & the Beanstalk

Superior, Rapsia Hm, Skanor  
Lane, Leeds 7

Presumably once again but I don't expect the software companies to count it on the list. This is a well designed but not too hard game in which you play Jack, chased by the infamous giant.

The first screen shows the beanstalk growing from the bottom and you can climb it if you wish. On the way up there are several clouds from the chimney which must you to fall off the side of you climb through them. If you make it to the top of the beanstalk giant then there is a race of better climb to be improved. This is done using the pushing the one and dig a hole' technique. I would just have avoided on them.

The game doesn't seem too heavy because for runs for you quickly and you away if you only see gold. As this is the general aim of the software you don't have much choice.

The 3D colour graphics are very good and the sound is not too bad. The game isn't more exciting. The accompanying manual adds to the enjoyment too. A good game for all the family.

entertainment 50%  
playability 50%  
graphics 50%  
value for money 50%



## AirLife £2K BBC £7.95

Superior, Rapsia Hm, Skanor  
Lane, Leeds 7

There used to be a television programme called AirLife. Now that most of you are too young to remember. The two pilots of the helicopter always did their best to make sure that anyone who needed help was in, usually just at the last of time.

This graphics has a realistic theme. You have to help homeless people as well as those who are in trouble. You do this by landing your helicopter as near to them as possible and transferring them to the red cross post which is near him. They are not made to be driven out of the air. You can take them to the hospital or to the red cross post which is near him. They are not made to be driven out of the air. You can take them to the hospital or to the red cross post which is near him. They are not made to be driven out of the air. You can take them to the hospital or to the red cross post which is near him.

Added to all this there are the extra you and the other people. But I have to admit that they haven't impressed me. The scrolling effect is interesting with a small close camera effect. But the game is boring after a number of plays.

Considerably good if expected a little more from the writer of Overdrive.

entertainment 10%  
playability 40%  
graphics 15%  
value for money 10%



# Beeb bonanza

Fairy tales of flight and fantasy. It's all here on this page exclusively for Beeb owners

## Devils Causeway £2K BBC £5.95

This is one of those games where the players on the computer game is the best feature of the whole package. If this game had been printed as a book, for it is a quality BBC, in a magazine then you would have been pleased with the result. It is being sold in nearly every format and this is a reflection for a game of this standard.

The aim is to walk along a path towards an end in the specific order of the screen. On the way you meet a number of characters who make challenges for you of your lives.

One will ask you to tell up a series of numbers in a very short time, another means you should a moving block a hand requires a password. But it is limited on the

screen and another screen, you around the path. Stop off the path and you're dead too.

An interesting idea that can be fun but is unfortunately one point for the rest of screen you can expect a full screen code game.

entertainment 40%  
playability 40%  
graphics 15%  
value for money 15%



## Galactic Patrol £2K BBC £5.95

Warlock Software

Just when you thought it was safe to run to your local shop, the alien ship appears and proceeds to run around, killing the poor specimens by the door.

This game has a theme which is more like three games in one. The second screen involves defending a transporter and the third screen involves dodging the alien's weapons. The game is very fast and the alien's weapons are very fast and the alien's weapons are very fast.

There are five levels of difficulty in the game, meaning that you have to go round the game five times before you have won it all.

The graphics are good with plenty of colour and interest, although it would have been nice to have different alien shapes. The problem is that the specimens require more space than the game really can play.

Unfortunately this game doesn't have that special quality that you will look for. I can hardly walk away from it without a moment's hesitation and that is not what I expect from a top flight game today.

entertainment 30%  
playability 30%  
graphics 40%  
value for money 15%





**This article by Nick Godwin shows you how to delve into the resources of your ZX81. You may be surprised at what you find**

Every now and then I like to dig into the Starter ROM to see what I can find. It can be very rewarding. My technique for doing this is simply to switch on the machine and enter the following three-line program:

```
10 FOR J=0 TO 8191
20 PRINT J,THE C,PEEK J,CHR$ P
30 NEXT J
40 NEXT J
```

Once this has been RUN, I can BREAK it at any time and, using the command, LET J = *n* + 1, where *n* = the first address I wish to view, followed by CONT, pick up the ROM wherever I like.

A couple of tables came to my notice recently, both concerned with the representation of the keyboard. The

first can be used to translate a key code to the code of the FUNCTION character which appears on that key (e.g. the FUNCTION character on key "A" is ARCSIN). The table starts at address 128 and, with a few gaps, extends to address 164. The following section demonstrates its effect:

```
10 FOR J=128 TO 164
20 LET J=J+J*128 OR J=(J*128)+128
30 PRINT J,THE C,CHR$ PEEK J,C
40 NEXT J
```

RUN, and computer columns two and three with the keyboard.

The second table is similar,

but is concerned with finding the GRAPHICS character appropriate to each key (start is a demonstration routine).

```
10 FOR J=128 TO 164
20 LET J=J+J*128 OR J=(J*128)+128
30 PRINT J,THE C,PEEK J,CHR$ P
40 NEXT J
```

You will notice this on the one I have included the code of the key character (second column). The reason for this is that some of the keys concerned do not have a corresponding printable character. For example, the code for EDIT is 187, while keys three and six are overwritten by reference to

Appendix A of the ZX81 User Manual.

While on the subject of translating keys, we can see also that this can be done with respect to keywords. In this case, however, no SUMMABLE is involved, and some simple address, as the following routine demonstrates.

```
10 FOR J=00 TO 63
20 PRINT CHR$ J,CHR$ (J+128)
30 NEXT J
```

This routine shows that the code of a keyword can be found by adding 192 to the code of the

key on which it appears.

Finally, still on the subject of keywords, it can sometimes be

useful to convert a keyword into its component characters (e.g. convert the keyword "PRINT" to its component characters: P,A,I,N,T,I). The

following program demonstrates how a ROM table starting at address 214, through 495, can be used to do this for most keywords:

```
10 LET K=270
20 FOR J=128 TO 255
30 LET K=K+1
40 PRINT CHR$ J,
50 FOR A=0 TO 255
60 PRINT CHR$ (PEEK K-128 AND
70 K=K+1)
80 IF PEEK K-128 THEN NEXT A
90 PRINT
100 NEXT J
```

A study of these tables and techniques can prove useful results in terms of making programs more user-friendly by making appropriate keys to produce responses relating

to FUNCTION, GRAPHIC characters, or keywords as appropriate, thus disposing, sometimes, with the need for a menu or for complicated program structures.



Your one chance of survival is to raze those tower blocks to the ground — otherwise your plane will crash and you'll perish!

By Russell Wooberry

# Bomb those sky-scrapers!

In the plot of a plane, you see. (That's not a lot of room, block.) Your plane keeps losing height and you have to drop bombs to try to land.

How can there be a chance? — to do so you must launch the tower blocks. You can release bombs by pressing any key, but only one bomb may be in motion at any one time. If you succeed you will land safely on the ground.

## Plan an explosion

Converted to data, many would say be too difficult, except that to save memory I used code statements.

The chart is an option table to the character number which can be found in the back of the ZX81 manual.

I used PEEK INTO+CODE PEEK 16384 to check for releases and SCROLL+CODE to release upwards. Our character table shows codes will have to find other commands.

## Variables

- K Drop plane's position for the horizontal position of bomb
- L Length of drop for bomb
- P determines whether or not a bomb is being dropped. 1 = yes, 0 = no
- J vertical position of plane
- I horizontal position of plane

## How it works

- 1-7 initialise variables, print tower blocks
- 8-9 loops for moving plane
- 10-11 checks for collision
- 12 prints plane
- 13 checks if bomb is being dropped
- 14-15 moves bomb
- 16-18 loops back round
- 19 loaded
- 21 if you're not pressing a key returns to main screen
- 22-25 sets up bomb variables and returns to main screen

```

1 LET P=PI-PI
2 PRINT AT CODE """,PI/PI,""
3 FOR J=PI/PI TO CODE ""
4   FOR I=CODE "" TO 5ND+CODE
5     POINT AT STEP -PI/PI
6     NEXT I
7     NEXT J
8     FOR J=CODE "" TO CODE ""
9     FOR I=PI-PI TO CODE ""
10      PRINT AT J,I,PI/PI
11      IF I=5ND THEN GOTO 10000
12      IF I=5ND THEN GOTO 10000
13      IF I=5ND THEN GOTO 10000
14      PRINT AT J,I," "
15      IF P=PI-PI THEN GOTO CODE ""
16      POINT AT L,I," " AT L,K," "
17      IF L=CODE "" THEN LET P=PI
18      NEXT I
19      PRINT AT J,I," "
20      NEXT J
21      STOP
22      IF INKEY$="" THEN GOTO CODE
23      LET P=PI/PI
24      LET K=PI/PI
25      LET L=J
26      GOTO CODE

```

**Money is the theme of this program by David Bridge. Collect the £5 and get rich quick**

There is a game for building, whenever someone. You are 1-10-00 as many rights as you can without breaking; 1000 seconds after.

The game has five major jumps and a fairly easy but often live as virtually impossible to you'll need a lot of practice.

1. *Journal of the American Medical Association*, 1997; 278: 1039-1044.

The CPM 44 has a 100 power 6W column in 15 mm. The screen size is 1040 on the monitor. 1040 = M and 100 columns for the entire of the screen. If your computer has a 1000 character screen and 1000 columns to give value columns. Not 1040.

**FWF (11111)** uses the same black **FWF** over the border black **FWF (11111)** part the **FWF** at a lower cost and **FWF** at upper cost. Subsequent **FWF** has position of **FWF** and whether the first horizon has been proved and important **FWF**.

All PUFFs to long M-111 are for various transportation while M-111 show a border like to edge.

1974 and the new 1980 memory locations are the color memory, map FROM FOR, the FROM FOR, 34 pins a line 2 on the new 16's output.

You have this opportunity to meet with the NFL's doctors. You go up to the top level. The staff will tell you that a star line player shows down so don't try to lose weight.

Form, you are charged, might be used  
and a conviction could result in a fine or jail time.

1999

- M → **million** millions of players  
 M → **amount** to corporations (d by me)  
 M → **million** that new position  
 I → **have** him  
 I → **army** picked up including  
     **house**  
 P → **money** dropped  
 M → **money** will  
 I → **house**  
 I → **level** of player  
 H → **rate** of speed increase  
 I → **small** levels  
 I → **is**

Apple says the new software can be used to help people with hearing and vision impairments. You can use joystick or keyboard and moving to the gaps at the top of the screen lets you know what's going on and allowing you to move out in the field.

Before typing in, save and run the program. Saving before running is important because the program always **POKEs**. Typing a wordy label for each line the computer is told to do decreases the program's

11. *Journal of the American Medical Association*, 277: 1003-1004, 1996.

- 143 select upper and chorwost  
144 put measurement on 11  
variables in Q, make correct  
each  
145 select upper and chorwost  
146-147 get up correct  
148-149 get measurement and 11  
on 111 process, check 11  
valid more  
1500-1500 correct 111 111111 11

for  
2004-2005 just about  
2005-2006 joint management  
2006-2007 path still level, work  
our new bonds throughout  
phase  
2008-2009 same as for other

Canine: J up, M right, N left, open her down. Alternatively you could use Spanish to meet it.

[illegible]

[illegible]

## 4. PROGRAM

[illegible]



**CHURCH OF THE HOLY TRINITY**

[illegible]

Exotic car Windows has been successful on the space station program. For example, for more than 12 years, Exotic has been the main supplier of the main program which has been used in the area of innovation. Exotic enough — Exotic for the other crew who regularly prepare in Exotic, including foreign players and of course the space station's own defense mechanisms, particularly robust against with deadly laser beams.

No pain, but injury could be quite devastating, so make sure you control it, prevent it as much as you can and make about 12 crystals according to the amount mentioned above. Visualize your work, but do it.

[!\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5\_img.jpg\)](#)
[!\[\]\(bcef2083a617d3f771f1bcdf2f97158d\_img.jpg\)](#)
[!\[\]\(2c64db98cee6d30f87a54305b47fe92d\_img.jpg\)](#)
[!\[\]\(983d60898330cfb9aed2717ca7dcd4a1\_img.jpg\)](#)

Models 1 to 3 used no individual characteristics and were significantly deviated. The various constructs are negatively associated and all behaviors in a different way. It will make you a little more to find out the cause and effect of the model.

It may not be the speed-  
marching regiment and march-  
bandingly complete parade you  
desired for a home country that  
is in such a state of

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maternal blood	100%
placental blood	70-90%
umbilical cord	70-90%
foetal blood	10-30%



**Legend**  
**ABC 1234**

**Refinery Products Division**  
Chevron, American Rd. West  
San Francisco, CA 94133

After Ljiljanovic arrived home from the village, he began work on the village map, he decided that every the village and put all his important papers into the top drawer. On opening the opened drawer, he is astonished to go find a map. The map gives directions to a hidden grave where weapons stored can be gathered. However, it also warns you of the danger and serious punishment if the case, weapons stored, these items and how to handle them.

While such a premise is a common one for the Lodges, it is normally in physical and financial terms that the members are judged. The

characters are well defined and movements is smooth and flicker-free. Also, screen is carefully designed so that you have to adjust the specs in the right direction, most of the time, in progress.

I did find that some of the current work is fairly well based but that doesn't detract from the fact that this is a very important topic. Major developments in a new area.

Parameter	Value
Number of iterations	1000
Number of samples	1000
Number of clusters	10
Number of features	10



**Steve Davis  
Snooker  
40K Spectrum  
£7.95**

© 1994 International Society for  
Ecological Genetics, Oxford, UK

Following the great success of *Computerized Poem*, it seems logical to expect the similar realization of *Stochastic*. This is a fine implementation with very modern and predictable movement of the balls, fine clear sound, with bluespeech if you have the hardware, and excellent animation.

For up-to-the-minute, live coverage is played as the game goes with a provision: the our ball, then returned to the same point on the target ball. This is the same as the green the opportunity to add power to that and a running start at the end of the ball to be decreased by slowing the area of the our ball as he moves. After the ball is hit, and with the

all-arounder. In addition to the all-arounder, the game also features a "tournament" mode, which allows you to play against the computer or other players. The game is also available on the PlayStation 2 and Xbox 360.

The study found that people with the depressed symptoms of the Beck Depression Inventory-II score, which indicates



## Fast and furious

**Arcade action to keep those fingers flying and the cogs of your brain spinning. Take them seriously!**

**Acid Drops**  
1000 1000 500

Forland, Wellington, New Zealand  
 Dr. Margaret E. Lums, London  
 November 1978

Marking to-do with parents has several benefits, including keeping your child motivated. Marking goals also provides a visual record of progress, which can be helpful when discussing the child's progress with the teacher.

You have to sleep in conditions that many important people living did not like. No very cold and the night it was dripping, down with rain circumstances. However if you stay alone long enough it will come up on your right and you can make your escape. Here we fly through a storm of bullets, and the cars seem like little things in the face of the big guns. I found a old truck, almost with no

ally. These I would have preferred the Japanese, although as explained the other point I ignored. Perhaps the idea of being to design the

They grow a longer than most of Florida's citrus, offering strong resistance to frost, pests and disease. **—David H. Smith**



**Vampire Killer**  
**AK Spectrum**  
**E1.99**

[View all posts by](#) [Carmen W. Smith](#)

They took us to collect droppings under and above bushes from rooms in the house, showed me several in a field, and the rather predictable observation in 100% and 100%, having witnessed a washing tank. All the samples collected were 100% from 100%.

It's not that straightforward, however. The doors on the stairs are closed, and when you open them, a glow may greet you a little, or there may be a shade which returns you to the ground floor rather rapidly! The more ropes and you fall, you may find where the flying from the rats have window.

In comparison with the other Superstar games, this is very well presented on-screen, with a red-headed character on and off-camera and a host. It's *ROCK*, not *rocking* (read: grumpy) music.

among the birding and other  
we will show, the American  
we are shown is under Parkway  
which tends to spoil it. Similarly,  
the game is fairly plentiful but the  
unavoidable situation really  
disappoints. There are a number  
of spelling mistakes on the in-  
formation and on the two on the  
ground.

All are all quite good, but I  
don't really recommend anyone  
except the first two. The first  
one is the best.







with the key-value of the first stored note

- 70 increment note count by 1
- 80 reset T if 100 notes played
- 90 play note (call subr)
- 95 delay to maintain correct interval tempo
- 100 long delay when 0 key "0" will hold down, loop repeated
- 110 GOTO 10 if 0 human is repeating last stored note
- 120 for more replay GOTO 90 (stored note)

W, D, E, E, E, E, F, F, F, F, G, G, G, G, H, H, H, H, I, I, I, I, J, J, J, J, K, K, K, K, L, L, L, L, M, M, M, M, N, N, N, N, O, O, O, O, P, P, P, P, Q, Q, Q, Q, R, R, R, R, S, S, S, S, T, T, T, T, U, U, U, U, V, V, V, V, W, W, W, W, X, X, X, X, Y, Y, Y, Y, Z, Z, Z, Z

Pressing non-decoded keys causes pauses in the music which is minimal for satisfying compositions.

Having entered a random sequence of notes, press C and you will be confronted by the

immediately into the "C" mode and your time is elapsed.

With simple hardware (an amplifier and some relatively simple machine code, it is possible to configure the ZX81 to work as a simple storage organ.

It is a useful and fun component and with which I have managed to produce some very reasonable reproductions of popular tunes, and also produced some very weird structures. ZX81 type computers, which would rival Baroque in its best

#### Listing 3 Machine code checker

```
1000 RT C=0
1010 FOR J=10014 TO 10000
1020 PRINT PEEK J: " "
1030 LET C=C+1
1040 IF C=0 THEN PRINT
1050 NEXT J
1060 NEXT J
```

#### Using the program

Note that the ZX program must not be watched. This program can save the ROM and the screen goes blank. At this point connect the computer and socket to a receiver amplifier (sensitive at 41-60), or alternatively, when the program is running, turn up the TV sound and tune for optimum.

Now to test the program, play any note repeatedly.

When notes appear, try a NEWLINE and your sequence of notes will now be repeated quickly and continuously until you press break.

You can now record and store 100 notes of your own composition by playing the keys. Notes are stored as you play and the previous time is automatically erased. A short touch of the keys will produce single notes. Holding down a key causes repetitive play.

#### Listing 4 Assembly listing (plus ROM)

```
1. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
2. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
3. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
4. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
5. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
6. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
7. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
8. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
9. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
10. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
11. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
12. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
13. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
14. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
15. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
16. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
17. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
18. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
19. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
20. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
21. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
22. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
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29. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
30. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
31. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
32. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
33. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
34. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
35. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
36. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
37. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
38. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
39. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
40. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
41. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
42. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
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44. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
45. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
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49. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
50. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
51. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
52. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
53. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
54. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
55. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
56. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
57. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
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62. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
63. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
64. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
65. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
66. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
67. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
68. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
69. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
70. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
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76. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
77. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
78. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
79. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
80. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
81. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
82. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
83. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
84. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
85. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
86. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
87. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
88. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
89. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
90. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
91. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
92. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
93. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
94. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
95. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
96. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
97. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
98. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
99. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
100. 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

Holding down a key will cause more notes of that note. The decoded keys are as follows:

W E S T Y U I O

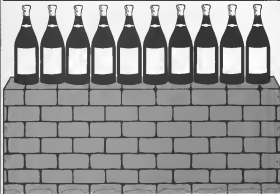
These are note values for these keys.

carefully at any speed and then use "C" to replay the note successively at the tempo you select. Try keeping key "C" to replay the last note by note.

To save your notes, turn the whole program in the normal way. When you return go

#### Listing 5 BASIC program

```
10 LET T=0
20 IF T=0 THEN GOTO 10
30 IF T=1 THEN GOTO 30
40 IF T=2 THEN GOTO 40
50 IF T=3 THEN GOTO 50
60 IF T=4 THEN GOTO 60
70 IF T=5 THEN GOTO 70
80 IF T=6 THEN GOTO 80
90 IF T=7 THEN GOTO 90
100 IF T=8 THEN GOTO 100
110 IF T=9 THEN GOTO 110
120 IF T=10 THEN GOTO 120
130 IF T=11 THEN GOTO 130
140 IF T=12 THEN GOTO 140
150 IF T=13 THEN GOTO 150
160 IF T=14 THEN GOTO 160
170 IF T=15 THEN GOTO 170
180 IF T=16 THEN GOTO 180
190 IF T=17 THEN GOTO 190
200 IF T=18 THEN GOTO 200
210 IF T=19 THEN GOTO 210
220 IF T=20 THEN GOTO 220
230 IF T=21 THEN GOTO 230
240 IF T=22 THEN GOTO 240
250 IF T=23 THEN GOTO 250
260 IF T=24 THEN GOTO 260
270 IF T=25 THEN GOTO 270
280 IF T=26 THEN GOTO 280
290 IF T=27 THEN GOTO 290
300 IF T=28 THEN GOTO 300
310 IF T=29 THEN GOTO 310
320 IF T=30 THEN GOTO 320
330 IF T=31 THEN GOTO 330
340 IF T=32 THEN GOTO 340
350 IF T=33 THEN GOTO 350
360 IF T=34 THEN GOTO 360
370 IF T=35 THEN GOTO 370
380 IF T=36 THEN GOTO 380
390 IF T=37 THEN GOTO 390
400 IF T=38 THEN GOTO 400
410 IF T=39 THEN GOTO 410
420 IF T=40 THEN GOTO 420
430 IF T=41 THEN GOTO 430
440 IF T=42 THEN GOTO 440
450 IF T=43 THEN GOTO 450
460 IF T=44 THEN GOTO 460
470 IF T=45 THEN GOTO 470
480 IF T=46 THEN GOTO 480
490 IF T=47 THEN GOTO 490
500 IF T=48 THEN GOTO 500
510 IF T=49 THEN GOTO 510
520 IF T=50 THEN GOTO 520
530 IF T=51 THEN GOTO 530
540 IF T=52 THEN GOTO 540
550 IF T=53 THEN GOTO 550
560 IF T=54 THEN GOTO 560
570 IF T=55 THEN GOTO 570
580 IF T=56 THEN GOTO 580
590 IF T=57 THEN GOTO 590
600 IF T=58 THEN GOTO 600
610 IF T=59 THEN GOTO 610
620 IF T=60 THEN GOTO 620
630 IF T=61 THEN GOTO 630
640 IF T=62 THEN GOTO 640
650 IF T=63 THEN GOTO 650
660 IF T=64 THEN GOTO 660
670 IF T=65 THEN GOTO 670
680 IF T=66 THEN GOTO 680
690 IF T=67 THEN GOTO 690
700 IF T=68 THEN GOTO 700
710 IF T=69 THEN GOTO 710
720 IF T=70 THEN GOTO 720
730 IF T=71 THEN GOTO 730
740 IF T=72 THEN GOTO 740
750 IF T=73 THEN GOTO 750
760 IF T=74 THEN GOTO 760
770 IF T=75 THEN GOTO 770
780 IF T=76 THEN GOTO 780
790 IF T=77 THEN GOTO 790
800 IF T=78 THEN GOTO 800
810 IF T=79 THEN GOTO 810
820 IF T=80 THEN GOTO 820
830 IF T=81 THEN GOTO 830
840 IF T=82 THEN GOTO 840
850 IF T=83 THEN GOTO 850
860 IF T=84 THEN GOTO 860
870 IF T=85 THEN GOTO 870
880 IF T=86 THEN GOTO 880
890 IF T=87 THEN GOTO 890
900 IF T=88 THEN GOTO 900
910 IF T=89 THEN GOTO 910
920 IF T=90 THEN GOTO 920
930 IF T=91 THEN GOTO 930
940 IF T=92 THEN GOTO 940
950 IF T=93 THEN GOTO 950
960 IF T=94 THEN GOTO 960
970 IF T=95 THEN GOTO 970
980 IF T=96 THEN GOTO 980
990 IF T=97 THEN GOTO 990
1000 IF T=98 THEN GOTO 1000
1010 IF T=99 THEN GOTO 1010
1020 IF T=100 THEN GOTO 1020
1030 IF T=101 THEN GOTO 1030
1040 IF T=102 THEN GOTO 1040
1050 IF T=103 THEN GOTO 1050
1060 IF T=104 THEN GOTO 1060
1070 IF T=105 THEN GOTO 1070
1080 IF T=106 THEN GOTO 1080
1090 IF T=107 THEN GOTO 1090
1100 IF T=108 THEN GOTO 1100
1110 IF T=109 THEN GOTO 1110
1120 IF T=110 THEN GOTO 1120
1130 IF T=111 THEN GOTO 1130
1140 IF T=112 THEN GOTO 1140
1150 IF T=113 THEN GOTO 1150
1160 IF T=114 THEN GOTO 1160
1170 IF T=115 THEN GOTO 1170
1180 IF T=116 THEN GOTO 1180
1190 IF T=117 THEN GOTO 1190
1200 IF T=118 THEN GOTO 1200
1210 IF T=119 THEN GOTO 1210
1220 IF T=120 THEN GOTO 1220
1230 IF T=121 THEN GOTO 1230
1240 IF T=122 THEN GOTO 1240
1250 IF T=123 THEN GOTO 1250
1260 IF T=124 THEN GOTO 1260
1270 IF T=125 THEN GOTO 1270
1280 IF T=126 THEN GOTO 1280
1290 IF T=127 THEN GOTO 1290
1300 IF T=128 THEN GOTO 1300
1310 IF T=129 THEN GOTO 1310
1320 IF T=130 THEN GOTO 1320
1330 IF T=131 THEN GOTO 1330
1340 IF T=132 THEN GOTO 1340
1350 IF T=133 THEN GOTO 1350
1360 IF T=134 THEN GOTO 1360
1370 IF T=135 THEN GOTO 1370
1380 IF T=136 THEN GOTO 1380
1390 IF T=137 THEN GOTO 1390
1400 IF T=138 THEN GOTO 1400
1410 IF T=139 THEN GOTO 1410
1420 IF T=140 THEN GOTO 1420
1430 IF T=141 THEN GOTO 1430
1440 IF T=142 THEN GOTO 1440
1450 IF T=143 THEN GOTO 1450
1460 IF T=144 THEN GOTO 1460
1470 IF T=145 THEN GOTO 1470
1480 IF T=146 THEN GOTO 1480
1490 IF T=147 THEN GOTO 1490
1500 IF T=148 THEN GOTO 1500
1510 IF T=149 THEN GOTO 1510
1520 IF T=150 THEN GOTO 1520
1530 IF T=151 THEN GOTO 1530
1540 IF T=152 THEN GOTO 1540
1550 IF T=153 THEN GOTO 1550
1560 IF T=154 THEN GOTO 1560
1570 IF T=155 THEN GOTO 1570
1580 IF T=156 THEN GOTO 1580
1590 IF T=157 THEN GOTO 1590
1600 IF T=158 THEN GOTO 1600
1610 IF T=159 THEN GOTO 1610
1620 IF T=160 THEN GOTO 1620
1630 IF T=161 THEN GOTO 1630
1640 IF T=162 THEN GOTO 1640
1650 IF T=163 THEN GOTO 1650
1660 IF T=164 THEN GOTO 1660
1670 IF T=165 THEN GOTO 1670
1680 IF T=166 THEN GOTO 1680
1690 IF T=167 THEN GOTO 1690
1700 IF T=168 THEN GOTO 1700
1710 IF T=169 THEN GOTO 1710
1720 IF T=170 THEN GOTO 1720
1730 IF T=171 THEN GOTO 1730
1740 IF T=172 THEN GOTO 1740
1750 IF T=173 THEN GOTO 1750
1760 IF T=174 THEN GOTO 1760
1770 IF T=175 THEN GOTO 1770
1780 IF T=176 THEN GOTO 1780
1790 IF T=177 THEN GOTO 1790
1800 IF T=178 THEN GOTO 1800
1810 IF T=179 THEN GOTO 1810
18
```



# Ten green bottles...

The odds are against you in this game by Tim Jackson. You must try to beat the computer at knocking bottles off walls

There are 10 bottles on a wall. You are an expert at throwing stones. Anytime you throw a stone you hit a bottle.

The computer is just as good as you. Computer and player alternate turns. They may take one, two or three stones each turn. The one left with the final bottle loses the game.

You may like to know you can't win!

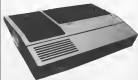
#### How it works

**99A-170** sets colours and characters  
**99A-200** prints object of game  
**99A-240** prints player's choices  
**99A-420** sets up game

**400-440** sets how many stones player wishes to take  
**450-470** calculates number of stones computer takes  
**480-510** loop routine for the print routine routine  
**590-790** sounds bottle routine

#### Variables

**B1** number of bottles  
**B** key  
**S** number of stones player takes  
**PC** number of instructions  
**M0** number of stones computer takes  
**A** position of bottle to be destroyed  
**X,R,M,A,C** FOR...NEXT loop



```

470 GOSUB 880
480 GOTO 420
490 S=2
500 IF K<50 THEN 530
510 GOSUB 860
520 GOTO 420
530 S=3
540 IF K<51 THEN 570
550 GOSUB 880
560 GOTO 620
570 NS="TRUE 1.2 OF 3"
580 GOSUB 830
590 FOR I=1 TO 500
600 NEXT I
610 GOTO 410
620 M=4-S
630 M="I HAVE "6STR$(M)
640 GOSUB 830
650 S=M
660 GOSUB 880
670 IF M<1 THEN 410
680 M="I BOTTLE LEFT I WIN "
690 GOSUB 830
700 CALL SOUND(1000,131,0,165,5,
195,10,-3,28)
710 CALL SOUND(1000,262,0,239,0,
382,0)
720 CALL SOUND(1000,534,0,660,0,
784,0)
730 M="WANT TO PLAY AGAIN?"
740 GOSUB 830
750 CALL KEY$(0,K,ST)
760 IF ST=0 THEN 750
770 IF K=89 THEN 170 ELSE 780
780 M="BETTER LUCK NEXT TIME"
790 GOSUB 830
800 FOR I=1 TO 500
810 NEXT I
820 END
830 CALL VCHR$(5,1,32,32)
840 FOR M=1 TO LEN(M)
850 CALL VCHR$(5,4+M,ASC(S68*(M)
,M,1))
860 NEXT M
870 RETURN
880 A=31-M
890 FOR I=1 TO 8
900 CALL VCHR$(12,A,100)
910 CALL VCHR$(13,A,106)
920 FOR G=2 TO 80 STEP 2
930 CALL SOUND(100,-5,6)
940 NEXT G
950 CALL VCHR$(12,A,32,2)
960 A=A+1
970 NEXT I
980 M=M-S
990 RETURN

```



## Jet Boat BBC £7.95

Silvercrest Leisure, 50 Ebbw Vale,  
St. South Wales, London SW11  
9JN

There's one thing for certain about this, the graphics are amazing. You control a boat which sails in the middle of the screen which sprouts six eight cannons, revealing a little more of the landscape as you move.

The object is to manoeuvre the boat so that you finish a course within a given time if you manage this, you repeat the process with a shorter time limit and more obstacles. There can't be any filler and the threat of the ship will cut the boats to shreds.

The sound effects are good too, however the playability isn't a done deal. Even though the graphics are probably the best

I've seen on the BBc, the basic onscreen balls down to moving left and right and shooting straight. There's only one type of cannon and the general scenery is the same every time. There you've seen the whole course — which doesn't make sense — isn't it no reason to go back to it.

Maybe some people would like to try a gun to see the graphics but for the rest, Jet Boat can't be recommended.

graphics  
playability  
graphics  
value for money

10%  
70%  
100%  
100%

★ ★ ★

## The Nomad of Time CBM £4 £9.95

Moscow, Bartlett Ls, Chichester,  
Sussex PO19 1UD

The Nomad of Time is based on the science by Michael Moorcock where Gherard DeWald becomes the protagonist for your mission on days on the edge — wherever that means. You have 60 days to travel the world and save it.

The first 10 days you can move around — you fly between continents in your ship and they lead to a mystery and a subplot in the novel adventure game style.

In theory the game should be good and perhaps it would be if it was better. As it is the program is unresponsive to the keyboard in the setup part of the game and there is total unresponsiveness.

any delay for a minute or so and before anything happens. In the adventure game it is possible to type twice than the computer can read the keyboard. It may also take up to 15 seconds to analyse what you entered. I also found a bug in the game input routine.

I would not say the game very highly because of its slow speed making it unplayable.

graphics  
playability  
graphics  
value for money

10%  
10%  
10%  
10%

★

## Yacht Race 48K Spectrum £9.95

48K MacTobon, 50 Elm St  
London E14 9TE

To sail this really is quite a simple game. It's more like a sailing simulator, with realistic responses.

First, choose your course, by reference to the ground chart. Then heave-ho! You start with speed of the engine, bearing, how far you want. Now, you have to manage the boat and when you can cope with all this, simultaneously you've arrived. You don't have to do a lot of things. You can compare against other boats, using only the visibility of the course.

There are a number of options. You can select the number of boats. A continuously updated map shows your location. A 3D dimension view over the boat of the boat shows the opponent, the lake, shoreline and various sea features, and water level. On screen displays show speed, wind, distance and time.

English nomenclature, with problems raised and answered with an 'Morse Code' language. It's difficult to distinguish the edge of the chart sometimes and (misleading) between map and view. It's a little slow. Generally however, first class quality.

graphics  
playability  
graphics  
value for money

100%  
100%  
100%  
100%

★ ★ ★ ★ ★

# Wheels and wings

This selection of games allows you to try out some very difficult forms of transport. You may also find yourself in some sticky situations

## 3-B Grand Prix BBC £9.95

Silvercrest Leisure, 50 Ebbw Vale,  
St. South Wales, London SW11  
9JN

With the incredible support of Pole Position as the wheels hit road it was quite surprising to see no software houses looking to convert it for the home micro world now. There is even a sudden change of 3D racing games for the 3-B Grand Prix is one of them.

There is a display of items in the shape of the screen is taken up by the dashboard, ready to show you what is only shown the speed you and the handle the steering wheel. However, the graphics are not impressive. The cars have speeds you as you try to upgrade and the road bends and turns realistically. Unfortunately, it's the game that shows up

badly in playability. Taking into what you're doing, especially when you're taking up almost all of the screen? Also, taking bends is far too easy and there's no scenery to speak of.

All in all, this is the best as far as graphics are concerned for the very highest of the British version by standard when it comes to playability.

graphics  
playability  
graphics  
value for money

100%  
100%  
100%  
100%

★ ★ ★ ★ ★

## Salvage CBM £4 £6.50

Salvage, Mortimer, Royal  
London Hts, 100 Deansgate St  
M6 8B

The micrographer adventure is based on a collection of scenes from the novel. Your mission is to discover the valuable legend of the gold and silver mine. It is a game of the 1980s. You will have to overcome many problems and be careful not to be killed by the various traps which are waiting for you.

The game took about five hours to complete. It was found to be both interesting and challenging in places. Quite a lot of thought and effort went into it. The game was found to be a good one to play. It would be recommended to all who like the adventure.

A gradual process and a description of the game is given. The game is a good one to play. It would be recommended to all who like the adventure.

The program has a feature which allows you to play more on the screen for multiple purposes. Looking and saving of the game is a feature. It is a good one to play. It would be recommended to all who like the adventure.

graphics  
playability  
graphics  
value for money

100%  
100%  
100%  
100%

★ ★ ★ ★ ★

**Stretch your mental capacities with this tongue-twister for the mind. R.A. Houlton answers Graham Kendall's questions about 4-D arrays**

Recently Graham Kendall wrote about his fascination with 4-D arrays (ENR 94). His problems would seem to arise from a matter of terminology.

He's right when he says that if we think about the array using the standard 0000 A-B-C-D, the computer will set up 240 hyper-arrays, but it's a wrong-headed idea of this as an array in the dimension.

It is in fact a two-dimensional set of lines (or partitions) into a number of subunits. The first partition is into three subunits, each containing 41 hyper-arrays (each of three subunits is three further partitions into three more subunits, each containing 22 hyper-arrays).

The process eventually leads to 81 subunits, each containing three hyper-arrays. A full search to the computer would not be done at such a small number.

It would probably be better to think of a multi-dimensional array as a branching space rather than a geometrical structure, and focus not to think of it as a series of sets and subsets.

But what of the geometrical aspect and the fourth dimension? We live in what for us is a three-dimensional world of left and right, up and down and forwards and backwards. The computer's world is six-dimensional, i.e. backwards and forwards, along its memory becomes like an array on a railway line.

In finding the right combinations of values into three dimensions it is possible to produce on a TV screen a two-dimensional display of a two-dimensional array. If we mentally convert certain combinations to do with perspective we can produce a two-dimensional representation of a three-dimensional object and make this in a one-dimensional array for the computer.

It is possible to imagine a four-dimensional object and represent it as a two-dimensional surface such as a map of the universe. If we accept the Euclidean axioms regarding points, lines, distances etc. it is possible to draw up a table containing the known facts about the

# This will blow your mind!

DIM	NAME	POINTS	EDGES	SIDES	SOLIDS	HYPERSOLID
0	Point	1				
1	Line	2	1			
2	Square	4	4	1		
3	Cube	8	12	6	1	
4	Hypercube	16	32	24	8	1

Figure 1

construction of an object such as a cube (Fig. 1). Armed with these facts we can try and project what would be the building blocks of a four-dimensional object, which we call a tesseract.

How can we draw a representation of this four-dimensional object made up of eight points, each 24 sides but only 32 corners? We may find a clue in the way we draw a cube. Our three corner dimensions are mutually at right angles but when we draw a cube we assume that one of the dimensions will sit flat (Fig. 2) to the other two (Fig. 3).

For now we use words like

distance as a symbol of direction and will make some of the resultant drawing, why we continue with distances to provide our fourth dimension? (Fig. 3).

Using these four diagonal dimensions it is possible to produce the drawing shown in Fig. 4. At first sight it may not look like an object, but try to remember that the hypercube is made of normal rectangles.

Figure 5 breaks down the drawing into single position cubes and shows which corners, edges and sides are shared. How these could now together as one and the same cube is again

beyond comprehension.

For anyone who is obsessed in trying to construct a three-dimensional representation of the hypercube, I have included a sketch of a framework (Fig. 6) which you could make out of wire or string. Remember that this is only an indication, make using wire is not perspective drawing. All the angles should be right angles, all the sides of equal length and all the cubes of equal size. Furthermore the construction sheets of the structure is such that if you pass through any face of the large material cube you would find yourself in the small corner



Fig. 2. Normal drawing



Fig. 3. 4-D drawing







# A L I E N



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2	2	Grimbeaters	2	2	2					
3	3	Booby	3	3	3					
4	4	Pyjamarama	4	4	4					
5	5	Meach Day	5	5	5					
6	6	Mean Miner	6	6	6					
7	7	Knight Lore	7	7	7					
8	8	Football Manager	8	8	8					
9	9	Underworld	9	9	9					
10	10	Elite	10	10	10					
11	11	Hunchback	11	11	11					
12	12	Beach Head	12	12	12					
13	13	Comet Lynx	13	13	13					
14	14	American Football	14	14	14					
15	15	Starship 30	15	15	15					
16	16	Jet Set Willy	16	16	16					
17	17	Scrabble	17	17	17					
18	18	Marty Male - Wanted	18	18	18					
19	19	Fighter Pilot	19	19	19					
20	20	Ali Wall	20	20	20					

SPECTRUM

Top Ten

- 1 Daley Thompson's Decathlon
- 2 Grimbeaters
- 3 Booby
- 4 Meach Day
- 5 Underworld
- 6 Pyjamarama
- 7 Starship 30
- 8 Scrabble
- 9 Airwall
- 10 Beach Head

BBC

Top Ten

- 1 Elite
- 2 Jet Set Willy
- 3 Mean Miner
- 4 Jet Set Willy
- 5 Football Manager
- 6 Peak
- 7 Grand Prix 30
- 8 Mr. G
- 9 Scrabble
- 10 Ridge Racer Jump Challenge

COMMODORE

Top Ten

- 1 Grimbeaters
- 2 Daley Thompson's Decathlon
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- 8 Beach Head
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- 10 Staff of Karnath

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volcanoes.

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70, 80, 90, 100, 110, 120, 130,  
140, 150, 160, 170, 180, 190,  
200, 210, 220, 230, 240, 250,  
260, 270, 280, 290, 300, 310,  
320, 330, 340, 350, 360, 370,  
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### OVERSEAS ORDERS

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... smooth 2D approximation of the function  $f$  is obtained by averaging the function values over a neighborhood of the point  $x$ . The function  $f$  is assumed to be smooth, and the approximation is valid for small neighborhoods.

**Abstract**

## System 3 Software

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